

APR 18 2005

PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q61190

Akira OOSAWA

Appln. No.: 09/800,773

Group Art Unit: 2625

Confirmation No.: 6412

Examiner: Bany Choobin

Filed: March 08, 2001

For: IMAGE PROCESSING METHOD AND SYSTEM, AND STORAGE MEDIUM

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Fuji Photo Film Co., Ltd. The assignment was recorded on March 8, 2001 at Reel 011617, Frame 0010.

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II. RELATED APPEALS AND INTERFERENCES

To the knowledge of Appellant, Appellant's assignee and representatives, there are no known appeals or interferences that would have a bearing on this appeal or would be affected by the outcome of this appeal.

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III. STATUS OF CLAIMS

Claims 1-16 remain pending in the application and have been rejected over the prior art as follows:

Claims 1-2, 4-5, 7, 9-11 and 13 have been rejected under 35 U.S.C. § 102 as being anticipated by Kano (U.S.P. 5,359,513).

Claims 3, 6, 8, 12 and 14-16 have been rejected under 35 U.S.C. § 103 as being unpatentable over Kano in view of Takeo (U.S.P. 6,169,823).

The rejection of claims 1-16 is being appealed.

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IV. STATUS OF AMENDMENTS

The Amendment filed on September 17, 2004 included no claim modifications. The arguments set forth therein are believed to be of record.

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V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention relates to a method and apparatus for examining the differences between multiple images of a particular object. Conventionally, the determination of such differences included calculating differences between corresponding structural positions of the two images, followed by extraction and enhancement of the difference. Specification, page 2, lines 11-23. Such a subtraction process requires alignment between the two images, and therefore misalignment between the images produces artifacts in the resulting subtraction image. When the differences are enhanced, artifact enhancement may make it difficult to detect the substantive difference of interest that occurs between the two images. Specification, page 2, lines 13-26.

Appellant's claimed invention overcomes the above deficiencies by providing image processing of an interimage difference image wherein a substantial difference between the images is enhanced relative to artifacts due to misalignment. The exemplary embodiment of Fig. 7 shows a subtraction image P_{su} output by an interimage processing means (Fig. 1, element 30). The artifacts L resulting from subtraction have long and thin forms which often appear along the outlines of the structural bodies. By contrast, a substantive difference (such as a diseased portion) K has a wider form resembling a circular or rectangular region. Page 16, lines 12-30. Application of morphology processing utilizing structural elements larger than a width of long and thin artifacts L and smaller than substantive area K results in an image whereby the substantive difference K remains, while the artifacts L become suppressed. See Figs. 8A-8E.

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VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether the 35 U.S.C. § 102 rejection of claims 1-2, 4-5, 7, 9-11 and 13 as being anticipated by Kano (U.S.P. 5,359,513) should be reversed.

Whether the 35 U.S.C. § 103 rejection of claims 3, 6, 8, 12 and 14-16 as being unpatentable over Kano in view of Takco (U.S.P. 6,169,823) should be reversed.

The rejection of claims 1-16 is being appealed.

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VII. ARGUMENT

A. Claim Rejections - 35 U.S.C. § 102

Claims 1, 2, 4, 5, 7, 9, 10, 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kano et al (US 5,359,513, hereinafter "Kano").

Appellant submits that the rejection of claim 1 should be reversed. Independent claim 1 recites "... said image processing carried out on said interimage-difference image is image processing by which the substantial difference between said two images represented therein is enhanced relative to artifacts arising due to misalignment of structural positions contained within said two images." In making this rejection, the Examiner asserted that Kano discloses an image processing method for carrying out image processing on an interimage difference image and that Kano discloses effects caused by various artifacts in subtraction images in Fig. 17. Kano provides the enhancement of the infiltrate in the patient's right lung after the two images are registered and digitally subtracted (*see*, col. 13, ln. 25-27, Kano). Kano acknowledges this misalignment, but does not enhance an inter-image difference relative to the artifact of misalignment.

The claimed invention takes a difference between 2 images and enhances that difference relative to artifacts of misalignment. By contrast, Kano performs a subtraction process between two images where the image registration technique involves the selection of a number of small regions of interest on the images based on data obtained by image analysis of the two chest images (*see* col. 2, ln. 23-28, Kano). The Examiner relies on the general suppression of misalignment as teaching the claim feature, citing cols. 9-10. The cited positions relate to a form

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of curve fitting to align images to minimize misalignment. Even with such curve fitting, there is no necessary result that the differences of the inter-image differences will be enhanced relative to the difference due to misalignment artifact in Kano. In other words, the physical alignment of Kano bears no relation to an interimage difference enhancement as claimed. Relatedly, the processing of the invention as claimed is carried out on images obtained by performing operations between images, whereas image processing of Kano is carried out on images before performing operations between images.

In the Advisory Action, the Examiner relies on col. 2-3 of Kano to teach the relative enhancement. However, the cited portion merely relates to enhancement and alignment without specifying the relative enhancement relative to the artifact.

Claim 10 describes features similar to that described above for claim 1.

Therefore, the 102 rejection of independent claims 1 and 10 should be withdrawn. Since claims 2, 4, 5, 7, and 9 depend from claim 1 and claims 11 and 13 depend from claim 10, and since the Kano reference does not disclose all the limitations of claim 1, Appellant submits that claims 2, 3, 5, 7, 9, 11, and 13 are patentable at least by virtue of their dependency from claims 1 and 10, respectively. Therefore, the rejection of these claims under 35 U.S.C. § 102 should be reconsidered and reversed.

B. Claim Rejections - 35 U.S.C. § 103

Claims 3, 6, 8, 12 and 14 - 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kano et al in view of Takeo et al (US 6,169,823, hereinafter "Takeo").

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Appellant submits that Takeo does not make up for the deficiencies of Kano as set forth above. Accordingly, Kano and Takeo fail to teach carrying out image processing to emphasize a difference between two images so that the substantial difference is distinguished from artifacts.

Therefore, the 103 rejection of claims 3, 6, 8, 12, and 14 should be reconsidered and withdrawn.

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

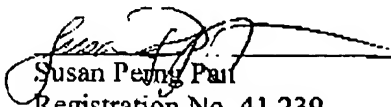
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CLAIMS APPENDIX

CLAIMS 1-16 ON APPEAL:

1. An image processing method for carrying out image processing on an interimage-difference image obtained by subjecting two desired images from among two or more images taken of the same subject to interimage processing and which represents the substantial difference between said two images, wherein

said image processing carried out on said interimage-difference image is image processing by which the substantial difference between said two images represented therein is enhanced relative to artifacts arising due to misalignment of structural positions contained within said two images.
2. An image processing method as defined in claim 1, wherein

said image processing comprises suppressing said artifacts relative to the substantial difference between said two images.
3. An image processing method as defined in claim 2, wherein

suppression of said artifacts relative to the substantial difference between said two images comprises performance of image processing based on a morphology process utilizing structural elements larger than said artifacts and smaller than said substantial difference.
4. An image processing method as defined in claim 1, wherein

said image processing comprises emphasizing the substantial difference between said two images relative to the artifacts.
5. An image processing method as defined in claim 1, 2, or 4, wherein

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said interimage processing comprises subtraction of corresponding structural positions within said two images.

6. An image processing method as defined in claim 3 wherein
said interimage processing comprises subtraction of corresponding structural positions within said two images.

7. An image processing method as defined in claim 1, 2, or 4, wherein
said two images are radiation images taken of the same subject at different points in time in a time series manner.

8. An image processing method as defined in claim 3, wherein
said two images are radiation images taken of the same subject at different points in time in a time series manner.

9. An image processing method as defined in claim 5, wherein
said two images are radiation images taken of the same subject at different points in time in a time series manner.

10. An image processing apparatus including image processing means for performing image processing procedures on an interimage-difference image obtained by subjecting two desired images from among two or more images taken of the same subject to interimage processing and which represents the substantial difference between said two images, wherein
said image processing means carries out image processing on said interimage-difference image by which the substantial difference between said two images represented therein is

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enhanced relative to artifacts arising due to misalignment of structural positions contained within said two images.

11. An image processing apparatus as defined in claim 10, wherein said image processing procedure comprises suppressing said artifacts relative to the substantial difference between said two images.

12. An image processing apparatus as defined in claim 11, wherein said image processing procedure comprises suppressing said artifacts relative to the substantial difference between said two images by applying image processing based on a morphology process utilizing structural elements larger than said artifacts and smaller than said substantial difference.

13. An image processing apparatus as defined in claim 10, wherein said image processing procedure comprises emphasizing the substantial difference between said two images relative to the artifacts.

14. An image processing apparatus as defined in claim 10, 11, 12, or 13 wherein said interimage processing procedure comprises subtraction of corresponding structural positions within said two images.

15. An image processing apparatus as defined in claim 10, 11, 12, or 13, wherein said two images are radiation images taken of the same subject at different points in time in a time series manner.

16. An image processing apparatus as defined in claim 14, wherein said two images are radiation images taken of the same subject at different points in time

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in a time series manner.

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EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

None

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RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii). **None.**